

WARNINGS OF UNUSUAL WEATHER CONDITIONS.

The only injurious conditions that occurred during July, 1898, were "northers" on the 15th and 26th, both of which were satisfactorily forecast on the previous day, and information furnished to all interested. The "norther" of July 25 was followed by a period of extremely high temperature throughout the interior of the State.—*W. H. Hammon, Local Forecast Official.*

FORECASTS AT PORTLAND, OREG.

No wind-signal orders were issued during the month, as there were no storms.

The "summer type" of weather conditions did not appear until the 7th, and even then the type was indistinct and not perfect in its movement. The areas of low pressure continued central too long over southeastern Oregon, and the areas of high pressure, in their eastward course, moved too much to the southeast. The movement of the highs, from the 21st to the close of the month, approximated closer to the summer type than any former ones this year. The movement of the summer highs has a relation to the movement of the lows in winter. When this relation is clearly defined, seasonal forecasts are possible. Under the influence of the summer highs, forecasts for several days are made with accuracy. Such forecasts are appreciated and are of value to the people. July and August are dry months, and the forecasts for thirty-six hours are not as valuable as in the other ten months of the year. The general information issued concerning crops, the wheat service reports, etc., are deemed of greater value during the dry season than any other information issued, though the weather and temperature forecasts, when marked changes occur, are of direct value. The output of ice factories and the shipment of frozen salmon and perishable produce are guided to a very great extent by the forecasts during heated periods. During the month resorts at the Beach and the steamers on the Willamette and Columbia rivers requested information upon which to base their operations.—*B. S. Pague, Local Forecast Official.*

AREAS OF HIGH AND LOW PRESSURES.

The tracks of six highs and the same number of lows were sufficiently well defined to be mapped on Charts I and II. On these charts are given the approximate position of the center of high or low twice each day, and also the barometer reading at the point nearest that center. The accompanying table presents a few facts as to the region of origin and disappearance, the length of path, and the velocity of the high or low. The following is a general description:

Highs.—The principal point of interest in the highs of this month has been their origin off the Pacific coast. In the case of IV, V, and VI, they were first noted off the south Pacific coast, and first moved up the coast before appearing on the land and moving to the interior. Highs I and II may have had such a motion, but the observations are too close to land to show it. Such motion has been noted in several months previously, and seems rather significant, though observations will be needed at sea in order to show the complete trajectory and surrounding pressure conditions giving rise to such a motion. The general track of the highs was in rather high latitudes. Highs I, II, and IV were last seen off the north Atlantic coast, III and VI disappeared off the south Atlantic coast, and V in the upper Lake region.

Lows.—All the lows began to the north of Montana and moved mostly to the north of the United States. No. I disappeared in Iowa, and the rest in or near the Gulf of St. Lawrence. The thunderstorms of the month, as reported by telegraph, culminated as follows: 3d, 23; 8th, 28; 17th, 26;

19th, 27; 23d, 25; 25th, 29; 28th, 23; 29th, 26; and 30th, 24. These storms occurred either in the southeast quadrant of a low or between two highs, or in a disturbed region showing a combination of these conditions.

The highest winds of the month were as follows: As low II passed into the Gulf of St. Lawrence a squall of 44 miles an hour occurred at Atlantic City, p. m. of 4th. On a. m. of 13th a squall of 60 miles an hour occurred at Sandy Hook. The storm in this case was off the New Jersey coast. On p. m. of 19th Green Bay had a thunderstorm squall of wind reaching 48 miles, and on 20th, p. m., Cleveland reported a squall wind of 52 miles.—*H. A. Hazen, Professor.*

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
High areas.										
I.....	1, a. m.	47	136	6, p. m.	42	65	3,570	5.5	649	27.0
II.....	6, a. m.	48	128	13, p. m.	47	60	3,750	7.5	500	20.8
III.....	13, a. m.	43	81	17, p. m.	24	81	2,160	4.5	480	20.0
IV.....	16, a. m.	37	124	24, p. m.	41	68	4,980	8.5	562	23.4
V.....	21, p. m.	42	127	26, p. m.	45	39	2,400	4.5	535	22.2
VI.....	27, a. m.	50	134	72, p. m.	31	79	3,030	6.5	458	19.1
Total.....							12,740	37.0	3,182
Mean of 6 paths.....							3,290		530	22.1
Mean of 37 days.....									534	22.2
Low areas.										
I.....	*29, a. m.	32	113	2, a. m.	43	94	1,530	3.0	510	21.2
II.....	1, p. m.	53	116	4, a. m.	48	53	2,880	2.5	1,152	46.0
III.....	3, p. m.	51	115	9, p. m.	47	64	2,850	6.0	475	19.8
IV.....	16, p. m.	51	111	21, a. m.	52	67	2,370	4.5	527	22.0
V.....	23, a. m.	53	109	26, a. m.	49	61	2,230	3.0	740	30.8
VI.....	24, p. m.	52	118	30, a. m.	51	62	2,940	5.5	535	22.3
Total.....							14,790	24.5	3,939
Mean of 6 paths.....							2,465		656	27.3
Mean of 24.0 days.....									604	25.2

* June.

† August.

RIVERS AND FLOODS.

Except in the North and Middle Atlantic States the stages of rivers throughout the country during July, 1898, were slightly in excess of the usual summer condition.

In the Hudson and Susquehanna rivers the water reached the lowest point of the season, and at times navigation was seriously interrupted. The reverse condition, however, prevailed in the South Atlantic and Gulf States, where frequent, and in some instances heavy, rains occurred, forcing the stagnant streams to higher stages, and allowing a resumption of navigation, which on some of the streams had for several months been suspended. In the upper Ohio the same conditions prevailed as in the Hudson and Susquehanna and navigation was seriously impeded; but a most opportune season of rain raised the water in the lower Ohio sufficient to enable boats to make regular schedules. The Mississippi, Tennessee, Arkansas, and Red rivers, while generally on the decline, had good navigable stages throughout the month.

In the Missouri River section heavy rains prevailed, which prevented the river from falling to the normal summer stage, and although the flood stage was not reached, the river at Omaha, on the 3d, registered 14.7 feet, the highest recorded so far this year.

The highest and lowest water, mean stage, and monthly range at 118 river stations are given in the accompanying table. Hydrographs for typical points on seven principal rivers are shown on the Chart. The stations selected for charting are: Keokuk, St. Louis, Cairo, Memphis, and Vicksburg, on the Mississippi; Cincinnati, on the Ohio; Nashville,